

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 2, 7-13, 15, and 17-21 are currently pending, with Claims 7-13 withdrawn as directed to a non-elected invention. Claims 1, 3, 5, and 14 have been canceled without prejudice; Claims 2 and 15 have been amended; and Claims 17-21 have been added by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1, 2, 3, 5, 14, and 15 were rejected under 35 U.S.C. § 112, second paragraph regarding various phrases recited in those claims; Claims 1, 2, 5, and 14-16 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,471,631 to Quintana (hereinafter "the '631 patent"); Claim 3 was rejected under 35 U.S.C. § 103(a) as unpatentable over the '631 patent in view of U.S. Patent No. 5,108,553 to Foster et al. (hereinafter "the '553 patent"); Claims 1, 2, 5, and 14-16 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,405,431 to Shin et al. (hereinafter "the '431 patent"); and Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the '431 patent in view of the '553 patent.

Applicants thank the Examiner for the interview granted Applicants' representative on August 22, 2003, at which time the rejections of Claims 2 and 15 under 35 U.S.C. § 112 were discussed and arguments in support of patentability were presented. Further, the limitations recited in new Claim 17 were discussed in light of the prior art of record. However, no agreement was reached, pending the Examiner's further consideration of the claims upon formal submission of a response to the outstanding Office Action.

Regarding the rejections under 35 U.S.C. § 112, Applicants submit that the rejections of Claims 1, 3, 5, and 14 are rendered moot by the present cancellation of those claims.² On the other hand, Claim 2 recites that the first plating layer is a *groundwork* on which the second plating layer is formed and gives conductivity to the inner surface of the via. Thus, Applicants submit that dependent Claim 2 further clarifies the function of the first plating layer and provides additional structural limitation to the independent claim. Accordingly, Applicants respectfully traverse the rejection of Claim 2 as indefinite. Similarly, Claim 15 recites that the second plating layer has a *flange portion* laminated on the first plating layer. Since the flange portion was not previously claimed, Applicants submit that Claim 15 recites further structural limitation of the second plating layer. Accordingly, Applicants respectfully traverse the rejection of Claim 15 as indefinite.

Applicants respectfully submit that the outstanding rejection of the claims under §§ 102 and 103 over the '631, '431, and '553 patents are rendered moot by the present cancellation of Claims 1, 3, 5, and 14.

The present amendment adds new Claims 17-21 for examination on the merits. Claim 17 is directed to a printed wiring board and recites limitations similar to the limitations recited in canceled Claim 1. Moreover, dependent Claims 2 and 15 have been amended to depend from new Claim 17, rather than from canceled Claim 1. New Claims 18-21 are directed to a method of manufacturing a printed wiring board, such as the printed wiring board recited in Claim 17. Accordingly, since Claim 17 recites limitations similar to the limitations recited in canceled Claim 1, Applicants will address the patentability of Claim 17 with respect to the previously applied '631 and '431 patents.

² Moreover, Applicants note that, regarding Claim 1, Claim 1 does not recite "an [insulating] layer having [a] first surface and a second surface located on an opposite side of the said first surface and further having circuit pattern inside the insulating layer," as stated in the Office Action. However, Applicants note that the structure recited in Claim 1 may be used in both a double-sided printed wiring board and a multilayer printed wiring board.

New Claim 17 is directed to a printed wiring board, comprising, *inter alia*: (1) an insulating layer having a first surface, and a second surface located on an opposite side of the first surface; (2) first to third circuit patterns arranged apart from one another on the first surface; (3) a plurality of fourth circuit patterns formed on the second surface; (4) a via formed on the insulating layer, the via having one end opened on the first surface of the insulating layer and surrounded by the second circuit pattern on the first surface, and another end closed by a circuit pattern of the plurality of fourth circuit patterns formed on the second surface of the insulating layer; (5) a first plating layer having a first portion that covers an inner surface of the via and a circuit pattern of the fourth circuit patterns that closes the other end of the via and which is exposed within the via, a second portion covering a part of the second circuit pattern on the first surface, and a third portion that covers a part of the first circuit pattern formed on the first surface such that the first circuit pattern has a part covered by the third portion and a part exposed on the first surface; and (6) a second plating layer laminated on the first plating layer and electrically connecting the second circuit pattern formed on the first surface with the circuit pattern of the plurality of the fourth circuit patterns that closes the other end of the via, wherein a part of the second plating layer that covers the third portion forms a thick portion in cooperation with the third portion, the thick portion having an increased thickness on a part of the first circuit pattern formed on the first surface and being shorter than the first circuit pattern. Moreover, the current capacity in the first circuit pattern is increased in the thick portion. New Claim 17 is supported by the originally filed specification and does not add new matter.³

Further, Applicants note that one of the advantages of the printed wiring board recited in Claim 17 is discussed on page 44 of the specification:

³ See, e.g., Figure 31 and the discussion on pages 42-44 of the specification.

Thus, according to the sixth embodiment, by setting the thick portion 52 at the specific portion 3a of the wiring layer 3, the current capacity of the wiring layer 3 can be increased without increasing the pattern width of the wiring layer 3. Therefore, even in the case where a large amount of current flows through the wiring layer 3, the wiring layer 3 can be made finer, and this wiring layer 3 can be easily arranged between the other wiring layers.⁴

The '631 patent is directed to a method of fabricating a microminiature multilayer circuit board with chemically drilled holes and electroplated interconnections. The '631 patent discloses a copper layer 12 covered by the plating layer 22 on the side of the circuit board 10 having the open end of the via 16. However, Applicants respectfully submit that the '631 patent fails to disclose first to third circuit patterns arranged apart from one another on a first surface of an insulating layer, as recited in new Claim 17. Moreover, Applicants note that the '631 patent discloses that the copper layer 12 is covered only by the single plating layer 22 and that the thickness of the copper layer is uniform throughout its length. Accordingly, the '631 patent fails to disclose a part of a second plating layer that covers a third portion of a first plating layer forming a thick portion in cooperation with the third portion, the thick portion having an increased thickness on a part of the first circuit pattern formed on the first surface and being *shorter* than the first circuit pattern, as recited in new Claim 17. Accordingly, Applicants respectfully submit that new Claim 17 patentably defines over the '631 patent.

The '431 patent is directed to a method for manufacturing a build-up multilayer printed circuit board in which a YAG laser is used to form a via hole in the multilayer printed circuit board. The '431 patent discloses that a plurality of vias are formed on a circuit board, and a copper foil deposited on the board is subjected to both electroless plating and electroplating. As a result, two conductive plating layers are formed on the copper foil. Thereafter, the conductive plating layers and the copper foil are etched, so that a second

⁴ Specification, page 44, lines 18-26.

circuit pattern is formed on the board. However, since the etching is performed after the copper foil is subjected to the two types of plating, two conductive plating layers remain adhered to the second circuit patterns. Thus, since the second circuit patterns are thick, it is difficult to reduce the pitch or width of the circuit patterns. Moreover, Applicants respectfully submit that the '431 patent fails to disclose a part of a second plating layer that covers a third portion of a first plating layer forming a thick portion in cooperation with the third portion, wherein the thick portion has an increased thickness on part of the first circuit pattern and is *shorter* than the first circuit pattern (wherein the current capacity in the first circuit pattern is increased in the thick portion), as recited in new Claim 17. Accordingly, Applicants respectfully submit that new Claim 17 patentably defines over the '431 patent.

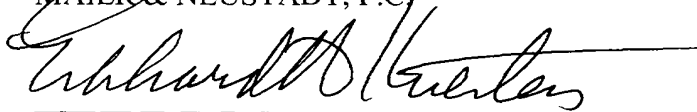
New Claim 18 recites limitations analogous to the limitations recited in new Claim 17. Applicants submit that the above-noted advantages of the claimed first and second plating layers can not be achieved by the manufacturing method disclosed by the '431 patent. Accordingly, for the reasons stated above, Applicants respectfully submit that new Claim 18 (and dependent Claims 19-21) patentably define over the '631 and '431 patents, taken either singly or in proper combination.

Thus, it is respectfully submitted that independent Claim 17 (and dependent Claims 2 and 15) and independent Claim 18 (and dependent Claims 19-21) patentably define over the '631, '431, and '553 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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